dilated and contained a quantity of liquid fæces. The small intestine was also somewhat dilated, and the contents of the stomach were dark in appearance and slightly fæculent in smell. The other organs presented nothing noteworthy, except the heart, which was very fatty. The tumour on microscopical examination was found to be of the nature of a columnar-celled epithelioma.

The points of interest in the case appear to be the probably long duration of malignant disease with stricture of the bowel giving no urgent symptoms; the supervention of extensive emphysema from a communication between the tissues of the abdominal wall and the bowel; and the difficulty in forming a diagnosis of the condition and of being sure that it was not due to fractured ribs, certainty being only assured by the post-mortem examination. The immediate cause of the condition was probably the increased pressure of the intestinal contents arising from the stricture acting upon a part of the diseased bowel weakened by the process of ulceration.

Stone, Aylesbury.

TETANY AND TETANOID SPASMS ASSOCIATED WITH GASTRIC DILATATION TREATED SURGICALLY.¹

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AN interesting paper by my colleague, Dr. Trevelyan, in THE LANCET of Sept. 24th, 1898, has attracted my attention to the importance of a symptom—tetany—which in the severe form described in his paper is manifestly a rare disease, but of which Case 1 in the present paper is a good example. It does not seem, however, to have been generally noticed that severe muscular spasms of a tetanoid character, possibly allied to if not really an early stage of true tetany, are frequently associated with gastric dilatation; yet it is a symptom which in a more or less severe degree frequently attends pyloric obstruction and which I have come to look on as a very frequent concomitant of the disease. A careful study of Dr. Trevelyan's paper leads one to the conclusion that fully-developed tetany, in association with stomach dilatation, is a symptom of extreme gravity and that in such cases a fatal termination is to be feared in a considerable percentage of cases. To quote from Dr. Trevelyan's paper: "If the term 'gastric tetany' is allowed to include the milder as well as the severer cases, and there is no sufficient reason against this view, then the disease may turn out to be more common than is usually supposed. The transition between gastric tetany strictly so-called, tetany with gastro-intestinal symptoms, and ordinary tetany would seem to be a gradual one. The prognosis of tetany occurring in gastric dilatation is undoubtedly very serious; nearly 75 per cent. of the cases die. The largest mortality occurs in the groups 2 and 3 [referred to in Dr. Trevelyan's paper], that is, where the spasm in the extremities is associated with tonic spasm in the head and trunk muscles or with clonic spasm. If the very strict views are held as to the disease then the outlook is almost hopeless; thus of the 11 cases recognised by Frankl Hochwart only 1 recovered. There is a danger here, as in some other diseases, that the fatal issue is raised to be the chief criterion as to the nature of the affection."

My own experience of tetany and of the severe muscular spasms in association with gastric dilatation leads me to think that we may possibly take a more hopeful view if the cases be treated surgically at an early period. I hope on some future occasion to report my experience in dilatation of the stomach treated surgically, as it has fallen to my lot out of nearly 60 operations which I have performed on the stomach to operate for this condition in nearly 30 patients, several of whom have had tetany or severe muscular spasms in a more or less pronounced degree. The following cases will serve to illustrate my remarks. In the first, the tetany was so pronounced that the question of strychnine poisoning crossed my mind. In the second and third cases, though there were well-marked tetanoid spasms, the cramps were limited to the extremities and the abdomen.

CASE 1.—A man was sent to me by his medical attendant in January, 1895, with a view to having something done in the Leeds Infirmary to relieve his condition. He had been suffering for five years from pain after the ingestion of food, with attacks of vomiting. Latterly his condition had become aggravated, the pains occurring from half an hour to one hour after each meal, being relieved only by vomiting, so that for the last six months he had had to give up his work as a printer. For some time before coming under my notice there had been very evident peristalsis from left to right in the epigastric region. Throughout the period over which his stomach symptoms extended his bowels had for the most part been very constipated, but there were occasional attacks of diarrhoea. During this time he had attacks of what he described as "cramps" in his limbs and especially in the legs. He had lost very considerably in weight, for in December, 1892 he weighed 9 st. 6 lb., whereas in January, 1895 his weight was only 7 st. 7½ lb. On examination there was found well-marked dilatation of the stomach, but the feature of the case which presents most interest in connexion with the present paper was the occurrence while under observation of severe tetanic spasms affecting almost all the muscles of the body. So extreme were these and so widespread (the muscles of the trunk and of the cervical region as well as those of the limbs being affected) that on Jan. 17th the question of possible poisoning from strychnine was raised. As palliative treatment of the stomach condition gave no relief he was submitted to pyloroplasty on Jan. 24th. The abdomen was opened and the diagnosis of cicatricial stenosis with hypertrophy of the pylorus was confirmed. The modified operation which I described some time ago² was done, a bone bobbin being employed. Recovery was uninterrupted, and although the cramps were present up to the time of operation he never had even a threatening of cramp afterwards. On Feb. 15th he was able to take a mutton chop for dinner without inconvenience, and by March 2nd (five weeks after operation) he had gained 8½ lb. Since then he has done very well. Two years after operation he had quite recovered his strength and was working as usual, his weight then being just over what it was in December, 1892, and quite 2 st. above his weight at the time of operation. There has been no recurrence of any "cramps" or of muscular spasms of any kind. In a letter received at the beginning of last month he speaks of some slight symptoms which may have had their origin in some stomach disorder, but he adds, "you will please understand that I am a new man to what I was when you saw me last."

CASE 2.—A man, aged twenty-four years, was seen by me on Oct. 5th, 1897, in consultation with his private medical attendant, on account of severe painful cramps of the extremities and of the abdomen with persistent vomiting. He gave the history of having had pain after food several years previously and of having vomited blood, since which time he had never been well and had gradually lost flesh. For some little time before I saw him he had vomited every day unless the stomach was washed out, and his weight from being over 10 st. had diminished to a little over 8 st. There was well-marked dilatation of the stomach but no pyloric tumour could be felt and simple stricture of the pylorus was diagnosed. He was admitted to the infirmary in October, 1897, and on the 21st of that month I performed pyloroplasty, as the pyloric orifice would only permit the passage of a No. 10 catheter. The transverse incision in the pylorus was sutured vertically over one of my bone bobbins. Recovery was uninterrupted, and from that time the cramps and vomiting ceased. He returned home within the month. On Oct. 23rd of this year I received from him the following letter: "It is with a grateful heart I write to thank you for the good received at your hands twelve months ago. I am thankful to say I have never had any trouble with my stomach since. I feel it my duty to acknowledge the good I received and also to thank you for your extreme kindness."

CASE 3.—A woman, aged twenty-nine years, was sent to me from the east coast in the spring of 1895, suffering from severe pain in the abdomen, associated with vomiting and loss of flesh; there was well-marked dilatation of the stomach, and the pain always started on the left of the abdomen and passed to the right, on which side, just below the ninth rib, there was well-marked tenderness with rigidity of the right rectus muscle. Operation was declined and I did not see the patient until

¹ A paper read before the Leeds and West Riding Medico-Chirurgical Society on Nov. 4th, 1898.

² Brit. Med. Jour., July 20th, 1895.

nearly the end of the year, when she told me that the pain in the abdomen was excruciating and that it recurred every day; she said it was associated with severe cramp in the limbs, especially in the legs and thighs, and that at night she was kept awake by the pain. Vomiting of large quantities of fluid occurred daily and she was steadily losing weight and strength. Her symptoms begun in 1888 and she had lost 2 st. in weight between that year and 1895. On Dec. 14th, 1895, I opened the abdomen and found the pylorus adherent to the gall-bladder, liver, and abdominal walls, and it was so much thickened as to form a distinct tumour. Pyloroplasty was performed after the adhesions had been separated. Recovery was uneventful and satisfactory in every way and she returned home within the month. She never had any return of the tetanic symptoms, and a report sent to me in March was to the effect that she had gained flesh and was well. The further history of the patient is not germane to the present paper. It will therefore suffice to say that in July, 1896, I saw her again, when she complained of stomach symptoms, but there was not much loss of flesh. Later the vomiting, loss of flesh, and well-marked stomach splash showed that the pyloric trouble had recurred. I performed gastro-enterostomy a month ago as I found a distinct tumour of the pylorus, which I believed to be simple inflammatory induration and not malignant, otherwise I should have excised the pylorus. The patient has made a good recovery and has returned home. The interesting point in her case is that there has never been any return of the painful cramps in the limbs since the first operation.

Though tetany occurs apart from gastric dilatation—for instance in children during teething, when it is frequently associated with gastro-intestinal disorders and not infrequently merges into general convulsions, and in other conditions apart from stomach disorders—yet tetany or painful muscular spasms of a serious character are so frequently associated with that condition that one cannot ignore the association as being merely accidental. It is curious that I have never seen the symptom in other than dilatation due to simple causes, such as adhesions to the pylorus, gall-bladder or liver, or in stricture of the pylorus due to the cicatrization of ulcers. I have never seen it in simple unobstructive dilatation or in dilatation due to cancer of the pylorus, though Dr. Trevelyan gives single examples of its association with both in his paper.

The immediate cause of tetany is perhaps beyond the scope of a surgical paper, but as my views are based on clinical experience they may be worth relating. I have noticed that the exacerbations of the tetanic state, especially in the first case related, were always associated with a painful contraction of the stomach, and that when the wave of contraction had reached the pylorus, which was previously incapable of being felt, it formed a distinct hard tumour. The abdominal pain then became very intense and the tetanic cramps in other muscles came on, or if already present became intensified. From this sequence of events I have come to the conclusion that the cause of the tetany is a double one—(1) the absorption of some poison from the dilated stomach which increases the excitability of the nervous system and (2) a reflex effect produced by the painful contraction of the pylorus. The practical outcome of my paper is that where tetany is, or its allied conditions are, associated with gastric dilatation surgical treatment is well worth considering before the symptoms become so severe as to lead to the almost hopeless condition described in the report of some of the fatal cases.

Leeds.

THE USE OF MORPHIA IN CARDIAC DISEASE.¹

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BEFORE studying the clinical effect of morphia in diseases of the heart let us first consider what effect it has upon the heart and circulation in health. When a full dose of morphia is injected the first thing noted is some increase in the pulse-rate; this is effected partly through the cardiac centre and partly through the ganglia in the heart-substance. Then

succeeds a period when the heart-beats diminish in frequency due to the stimulation of the vagus. If a sufficiently large dose be given this stimulation is succeeded by a period of depression or paralysis of the vagus which is shown by an increased frequency of the pulse due to the loss of balance between the inhibitory action of the vagus and the accelerator fibres. In the majority of cases, however, the intrinsic ganglia of the heart have ere this become paralysed themselves, so that they are unable to take advantage of the withdrawal of the inhibitory influence of the vagus, and so there is a persistence of the slow pulse, which gradually gets weaker and weaker until death ensues.

The action upon the vessels appears to be depressing from the first. The one period which physiologically suggests that morphia might be beneficially used in the treatment of cardiac disease is in the stage where the vagus is stimulated and the heart-beats are diminished in frequency. In the first instance I approached the subject entirely from the clinical side, and it was not until the treatment which had been begun in despair had proved of great benefit in several cases that I sought a physiological basis for that which is, I think, a clinical fact. Those books to which I have access universally agree in condemning the routine administration of morphia in cardiac disease, although most of them record the bald fact that it is occasionally useful. I have little to offer beyond the bare recital of the cases treated, but before considering these let me briefly glance at the action of the drug upon the kidneys, as it was here that I apprehended the greatest danger.

Of all the lessons which were hammered into me during my hospital career none was more persistently driven home than the fact that it is extremely dangerous to administer morphia in kidney disease or derangement; and as in an imperfectly working heart there is nearly always associated renal trouble, either in the shape of diminution in the amount of urine excreted or in the presence of albumin and diminution of the amount of urea and other excretives, so it may be imagined that I watched the quantity and quality of the urine passed by the patients under observation with much interest. Morphia can be detected in most of the secretions; a large proportion is excreted in the bile. It can also be found without much difficulty in the urine. The action of morphia is to diminish the amount of urine passed, to render probable the re-absorption of the drug from the dulled sensibility of the bladder, while in those cases where there is diminished excretory power of the kidney due to disease the danger of retention and accumulation of the drug on the system is sufficiently alarming.

I was first led to try the administration of the drug in those distressing cases of heart-disease (mainly of mitral incompetence) where the exhibition of digitalis and its allies, strophanthus and convallaria, appears to do nothing more than excite persistent vomiting and where the stomach retains practically nothing, where the heart is extremely irritable and irregular in rhythm and the pulse in volume, where often an ever-present dyspnoea renders the condition of the patient intolerable from exhaustion and from want of sleep, and where there may also be oedema from a failing circulation, and a scanty amount of albuminous urine. In these cases I have seen the hypodermic injection of morphia effect the most gratifying results. The pulse has become steady, strong, and regular, the oedema has disappeared, the dyspnoea has been relieved, and the urine, instead of being scanty, high-coloured, of high specific gravity, and containing albumin, has become normal in amount and character and the albumin has become much less or has entirely disappeared.

CASE 1.—A man, aged fifty years, was seen by me in consultation in June, 1897; he had been confined to his bed for two months and had been unable to go to business for six months. He was suffering from urgent dyspnoea which had prevented his sleeping for many days. His legs were oedematous and his urine was scanty, loaded with urates, and it contained one-tenth albumin. His pulse was small, easily compressible, 120 to the minute, and irregular in time and volume. His heart was enlarged, the apex beat occurring in the sixth interspace 1 in. outside the nipple line. There was a distinct systolic murmur heard best over the aortic area. Every drug which had ever been suggested as of use in cardiac cases had been tried and had proved of no avail. I suggested hypodermic injections of $\frac{1}{4}$ gr. of tartrate of morphia and the effect was marked from the first. He slept quietly and comfortably, the heart gradually came down to 80 beats in the minute, the urine increased to 70 oz., the albumin cleared up, and the oedema disappeared. The

¹ A paper read before the West Kent Medico-Chirurgical Society on April 1st, 1898.